THE HONORABLE JAMES L. ROBART

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IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

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MICROSOFT CORPORATION,

10   Plaintiff,

11   vs.

12   MOTOROLA, INC., et al.,

13   Defendants.
    _____
14   MOTOROLA MOBILITY, INC., et al.,

15   Plaintiffs,

16   vs.

17   MICROSOFT CORPORATION,

18   Defendants.

19

Case No. C10-1823-JLR

DECLARATION OF PETER E. ROSSI
IN SUPPORT OF MICROSOFT
CORPORATION'S RULE 702
MOTION TO PRECLUDE
TESTIMONY BY CHARLES R.
DONOHUE AND DR. R. SUKUMAR

      I, Peter E. Rossi, hereby swear under penalty of perjury under the laws of the United

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States of America, to the following:

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      1.   I am over 18 years of age.

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      2.   I have been retained by counsel for Microsoft, Inc. to provide an analysis of,

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and a response to, the expert report of Dr. R. Sukumar, dated July 24, 2012. I have also been

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1   asked to provide comments generally on conjoint analysis and its applicability or relevance to

2   the issues raised in this action.

3   3.   I have a PhD in economics from the University of Chicago. I have published

4   more than 40 refereed articles and one book on topics in quantitative marketing, economics,

5   statistics, and econometrics. In particular, my work on Bayesian methods for analysis of

6   conjoint data provides the basis for the algorithms in the software (Sawtooth Software's

7   Hierarchical Bayesian Analysis of Choice-Based Conjoint data (HB-CBC)) used by Dr. R.

8   Sukumar.

9   4.   I am presently the James Collins Professor of Marketing, Statistics and

10 Economics at the Anderson School of Management, UCLA. I hold a joint appointment in the

11 Anderson School and the Economics department. Since 2010 I have taught both masters and

12 doctoral courses in marketing, economics, and statistics.

13   5.   I have been elected a fellow of the American Statistical Association and the

14 Journal of Econometrics in recognition for my work in quantitative marketing, statistics and

    economics.

15   6.   In the area of intellectual property, I have performed expert and consulting work

16 related to valuation of both apparatus and method patents with applications in the consumer

17 electronics area. Specifically, I have provided a report and testimony regarding conjoint

18 analysis in Apple Inc. v. Samsung Electronics Co. Ltd. et al., (N.D. Cal.).

19   7.   Dr. Sukumar has failed to provide the most basic information required to

20 evaluate or verify his methodology, data gathering, calculations or conclusions. Dr. Sukumar

21 transmitted undocumented files along with his report. There is no documentation, data

22 dictionary, or explanation of how any statistic produced in his expert report was calculated.

23 No documentation was provided about the design, pre-testing, or sampling procedure for his

24 survey. This violates scientific standards for transmittal of evidence as well as accepted

25 procedures known to me for statistical experts in a legal proceeding. Dr. Sukumar's report and

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accompanying materials contain insufficient information either to reproduce or verify the results of his survey, rendering them unreliable.

8.   Errors in the design and execution of the Sukumar survey render the survey data useless for any conclusions regarding Xbox users or the value of Xbox features.

(a)   Dr. Sukumar designed a survey with highly technical terms such as MBAFF and interlaced/progressive video scan. His report represents that certain unidentified individuals performed a pre-test. However, he provides neither evidence of a valid pre-test procedure nor an adequate description of the procedure. It is likely that few, if any, respondents have a working understanding of the term "MBAFF" as it relates to the H.264 standard, implying that whatever pre-test was done (if any) was inadequate. Moreover, I understand that even technical experts familiar with H.264 coding tools would be unable to discern whether a given video clip had been coded using the MBAFF functionality in the H.264 standard from watching the clip.

(b)   Dr. Sukumar uses a convenience sample from an internet panel provider. All respondents completed the survey for a fee. Dr. Sukumar does not provide any evidence that his sample is representative and can be projected to the population of Xbox users or individuals likely to purchase an Xbox.

9.   Dr. Sukumar fails to provide any valid measure of the margin of error for his estimates. Any statistical estimate must be judged in relation to the margin of error in the estimate. Dr. Sukumar does not provide any valid margin of error estimates for most of the calculations presented in his report. The only margin of error estimates he provides are for his MVAI. It is a simple matter to see that Dr. Sukumar's margin of error estimates for MVAI are wrong. It is also apparent that his reported margins of errors understate the true margin of error in his MVAI estimates.

10.   Dr. Sukumar designed and fielded two surveys intended to get at the value of Xbox product features that comply with the 802.11 and H.264 standards. He does not opine on

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1   whether or not the patents-in-suit are essential to these standards but assumes that the Xbox

2   product could not support the 802.11 or H.264 standards without infringing an unidentified set

3   of those Motorola patents. Of course, Xbox owners and users do not directly place a value on

4   the standards themselves, but, instead, place a value on the product features that comply with

5   the standards. Given the ubiquitous use of the 802.11 standard in wireless devices, Dr.

6   Sukumar assumes that without the ability to practice the 802.11 standard, the Xbox could not

7   support Wi-Fi (at least internally). He similarly assumes that in order to stream or play HD

8   content, the Xbox needs to use the H.264 standard and, therefore, the Xbox could not support

9   HD content from any source without infringing some of the Motorola patents. Thus, Dr.

10 Sukumar designed a survey to value generic, internal Wi-Fi functionality and the generic

11 ability to play HD video content using the Xbox. Dr. Sukumar uses a particular type of survey,

12 called a conjoint survey, which is designed to simulate a marketplace in which there are

    variants of the Xbox with and without Wi-Fi/HD content features.

13   11.   All sample surveys start with the design of the survey questionnaire. Often the

14 design of the questionnaire begins with informal qualitative interviews with consumers to

15 determine how they view their product experience and what attributes they find particularly

16 important. While Dr. Sukumar claims that qualitative interviews were performed at his

17 direction, he was only able to produce a one-page, hand-written document to verify that these

18 interviews took place. This document appears to consist of notes on an interview (or possibly

19 more than one interview, given the use of tally marks on one page), but it is very difficult to

20 read. Again, no explanation was given for the source of this document or how to decipher the

21 contents of the document.

22   12.   A draft of the survey questionnaire should be pretested to determine if

23 respondents understand the survey questions. Typically, the results of the pre-test inform

24 revisions of the survey questionnaire. Once a finalized questionnaire is developed, a sampling

25 procedure is established to select and administer the survey to sample respondents. Dr.

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1 Sukumar reports that certain individuals conducted a pre-test but he has neither provided

2 documentation of a valid pre-test nor identified any part of the survey questionnaires that was

3 revised as the result of the pre-test.

4   13.   Dr. Sukumar used Authentic Response to implement the sampling procedure

5 and administer the questionnaire via a web interface. Authentic Response is an internet survey

6 provider. Dr. Sukumar does not identify or comment on the procedures implemented by

7 Authentic Response to select their panel but does state that he directed that members of the

8 Authentic Response panel be selected "at random" for invitation. Survey respondents were

9 compensated by a "free gift." Dr. Sukumar does not provide any details of any efforts made to

10 insure that the sample respondents devoted reasonable diligence and effort to completion of the

11 survey.

12   14.   From the perspective of patent valuation, there are two parts of Dr. Sukumar's

13 surveys: a) Questions regarding usage of some of the features allegedly enabled by the patents

14 and b) A conjoint analysis which is used to provide an estimate of the "market value" of the

    features.

15   15.   It should be emphasized that, in order to undertake his MVAI or "market value"

16 computations, Dr. Sukumar had to undertake a complex and highly technical set of statistical

17 calculations on the raw conjoint data. Conjoint analysis involves estimating a model of choice

18 among the conjoint alternatives and establishing what the conjoint literature calls "partworths"

19 for each sample respondent who completed the conjoint questionnaire.   These partworths

20 represent a measure of the value of the feature to each respondent. The units of measurement

21 of these partworths are not in dollars but in an arbitrary "utility" scale. To interpret the results

22 of the conjoint analysis, the partworths must be converted to dollars. This is done through

23 what is commonly called a Willingness To Pay (WTP) calculation. The WTP calculation

24 expresses the value of a product feature in dollars and should be interpreted as the maximum

25 amount the respondent would be willing to pay for an Xbox with the feature being tested (as

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1   opposed to the Xbox without the feature). Dr. Sukumar computes what amounts to an average

2   WTP (technically, it is a ratio of averages) to summarize the average WTP of the sample which

3   he summarizes in tables 11 and 15 of this report. He provides no interpretation or guidance as

4   to how these numbers could be used to value the patents, instead leaving them unexplained and

5   not reproducible by others.

6   16.   In order to facilitate peer review or otherwise permit meaningful evaluation of

7   the results of any scientific analysis, it is the responsibility of the person sponsoring the

8   analysis to provide full documentation of his or her analysis. In the case of statistical analyses

9   such as the ones performed by Dr. Sukumar, all documentation required to evaluate the sample

10 survey, the sampling procedure and all statistical calculations must be provided. Complete

11 documentation enables a scientist to evaluate the adequacy of his questionnaire design and

12 sampling procedure and to replicate all statistical calculations. It should be emphasized that the

13 statistical calculations undertaken by Dr. Sukumar are elaborate and do not consist of simple

    summary statistics, like averages.

14   17.   Instead of the necessary documentation required to evaluate Dr. Sukumar's

15 procedures and replicate his findings, I received only undocumented files. Even the file names

16 are cryptic and convey no meaning. A number of the files are in SPSS save format and not

17 available in one of the standard formats used to convey data.

18   18.   After I completed my rebuttal report, I obtained further documentation from

19 Motorola. In particular, I was provided with the output files from the analysis conducted by

20 Dr. Sukumar using Sawtooth software . These log files confirm that Dr. Sukumar incorrectly

21 imposed constraints on his analysis which bias his analysis toward higher MVAI values for

22 both the H.264 and 802.11 Wi-fi features. According to the log files, Dr. Sukumar imposed

23 constraints on the partworths that insure that his estimates will always value an Xbox product

24 with H.264/802.11 features higher than the product without. This precludes the possibility that

25 his analysis would conclude that these features are not valuable to the respondents. Dr.

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1   Sukumar omitted this material from his report. What he has done essentially precludes the

2   possibility that his survey would find the features in question to be of zero value. This is

3   unacceptable and unnecessary. It would have been a simple matter to leave these constraints

4   out of this analysis. In fact, the default in Sawtooth software is not to constrain any

5   partworths.

6   19.   In his report, Dr. Sukumar states that he selected 60 pre-test respondents. Based

7   on the scanned forms produced in response to my request for further documentation, it appears

8   that Optimal Strategix employees telephoned the pre-test respondents AFTER they completed

9   the questionnaire on line. In these follow-up interviews, the respondents were asked only one

10 question: "Overall, when you were taking the survey, can you tell me whether any questions

11 or wording was unclear?" It appears that most if not all of the 60 respondents responded "no"

12 or "none were unclear." In his report, Dr. Sukumar calls these interviews "open ended verbal

13 de-briefs." If a respondent, after the fact, responds that all questions were "clear," then the

14 interview terminates. There is no attempt to probe the understanding of the respondent for the

15 terms and questions in the survey. Given that the interview, contrary to accepted pre-test

16 practice, was conducted after the respondent completed the survey, it might be difficult if not

17 impossible to probe the respondents' understanding of terms, instructions, or questions.

18   20.   A more commonly accepted approach is for the interviewer to ask probing

19 questions immediately following each response, when the specific terms, instructions, or

20 questions are fresh in the respondent's mind and the respondent remains engaged in the

21 process. Such an approach is more likely to elicit accurate and helpful feedback than asking

22 open-ended questions after the survey has been completed, when the respondent may feel that

23 he/she has fulfilled his/her obligations and may be inclined to provide answers expected to

24 shorten the interview. Indeed, that was the case in Dr. Sukumar's "pre-test" protocol; if a

25 respondent answered that the questions and terms were clear, the follow-up interview was

    terminated. If, for example, the term "MBAFF" was unclear to the respondent, it is more

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likely that this would be revealed to the pre-test interviewer in the standard protocol which inquires about each question immediately before and after the pre-test respondent answers the question. In contrast, if asked an open-ended question about the clarity of the survey some time after the survey was completed, a respondent may not recall the confusing question/term or simply may not be focused on the confusing question/term.

21.   Instead of conducting a pre-rest, Dr. Sukumar conducted follow-up interviews. No valid pre-test can be conducted after the fact. The idea of pre-testing is to actively de-brief a respondent as they are completing the survey. This is the only way it is possible to determine with any rigor if they fail to understand a term or question in the survey. Suppose a respondent misunderstood a term or question in the survey; in that situation, he or she might very well respond that the questions were clear. The MBAFF term provides a good example. If a respondent does not know what MBAFF means or if he misunderstands its meaning, he could still reply that he found the questions "clear."

22.   Not only is there no evidence that any valid pre-test was performed, the wording of the questionnaire implies that whatever pre-test procedures were employed were not effective in rendering an intelligible questionnaire. Consider questions QH5A1 and QH5A2 in the H.264 questionnaire. Question QH5A1 asks "please select the types of video content you have viewed on your Xbox Console." The choice options are "Interlaced," "Progressive," and "Not Sure." Technically, the question is poorly phrased, as "interlaced" and "progressive" refer to video scanning methods, not types of video content. Dr. Sukumar made no effort to determine if the survey respondents understood the highly technical terms used in the question. More importantly, it is my understanding that there is no easy way one can determine from watching video content streamed from the internet or downloaded and played whether the video is interlaced or progressive scan. Visually it is almost impossible to distinguish interlaced and progressive scan video output when displayed on even a high quality display.

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23.   53.1 per cent of the H.264 survey respondents replied that they were "unsure" whether they had viewed video content displayed with interlaced or progressive scanning. Given that it is difficult if not impossible to distinguish between interlaced and progressive video, I would expect that closer to 100 per cent would state "unsure" if the respondents actually understood the meaning of the terms. It is possible that respondents were not reading the questions carefully or were responding with choices that they thought the sponsor of the survey wanted to see. It is also possible that they might be confused and simply respond as to whether they had ever heard the term interlaced or progressive scan. We will never know exactly whether respondents were confused or simply guessing in order to complete the survey and receive compensation because a valid pre-test was not done.

24.   Question H5A2 assumes an even more unlikely knowledge of the actual meaning of complicated aspects of the H.264 or MPEG-4 AVC standard. MBAFF is an acronym for Macroblock-adaptive frame-field. To understand the meaning of MBAFF requires an advanced understanding of video encoding/decoding technology. But Dr. Sukumar's survey asks the respondent to indicate if they have viewed video content that uses MBAFF. Surely, few if any respondents had any idea of what this is referring to. Moreover, I understand that it is not possible for a viewer to discern whether the video content has been coded using MBAFF technology. Only those respondents who responded "interlaced" to question H5A1 were given an opportunity to respond to question H5A2. Of those respondents who answered H5A2, only 17 per cent indicated that they were "not sure." Given that MBAFF is a highly technical term that is very uncommonly used, it seems highly likely that most respondents did not know what this term means (recall Dr. Sukumar does not define it other than to state the words that make up the acronym). I would then expect more than 95 per cent to respond "not sure." The fact that so few actually responded "not sure" indicates that survey was poorly designed and that respondents were not putting forth much effort in completing the survey.

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25.   Dr. Sukumar's conjoint survey uses an H.264 attribute for hypothetical product profiles. That is, he asks survey respondents to choose between products, some of which have H.264 capability and some of which do not. He does not define H264 other than to explain "Built-in H.264 decoding capability. Supports decoding of video available over the Internet." (Sukumar Rpt. p.19) Not all video that is available over the Internet is encoded using the H.264 standard. His instructions could give the false impression that anytime one streams or downloads video content from the internet, he/she is using the H.264 protocol. For example, the most popular video site, YouTube hosts a great deal of video content which does not require H.264 for viewing http://support.google.com/youtube/bin/answer.py?hl=en&answer=55744. A great deal of Flash video content does not require H.264 for decoding as well.

26.   A valid pre-test would have caught and weeded out these confusing and unintelligible questions, which incorporate technical terms and suggest that the respondent could ascertain aspects of the coding process that are, for all practical purposes, obscured from the end viewer of video content. The fact that the questions remained in the questionnaires suggests that any pre-testing performed was inadequate. Lack of adequate pre-testing increases the chance that the data collected from the survey are unreliable.

27.   In the conjoint portion of the 802.11 survey, the 802.11 standard is referred to in the specification of attribute levels. Dr. Sukumar's survey does not use the full designation 802.11 b/g/n but instead refers to "B/G/N" or "B/G" networks. These are non-standard terms. Neither the Xbox website nor vendors of Wi-Fi access points or routers use these terms. This standard is consistently referred to as 802.11 b/g/n. It is doubtful that many survey respondents understand the distinction between b/g and b/g/n (which is commonly referred to as 802.11 n). The 802.11 n standard subsumes 802.11 b/g and is designed to use multi-antennas and different frequencies for optimized performance. This is not explained in the survey. The use of non-standard terminology and the failure to explain the terminology

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employed render the 802.11 conjoint exercise unnecessarily complicated and confusing.
Again, a proper pre-test would have exposed this deficiency and led to appropriate
modifications tending to result in more reliable and useful survey data.

28.   In the H.264 conjoint survey, an "H.264" attribute is either present or not in
each possible profile or hypothetical product. Again, there is no effort in the questionnaire to
explain what H.264 decoding capability means - only the technical acronym appears in the
document. The survey also mentions the ability to "stream or download HD content" as well
as the ability to "Watch HD Live Television, HD Movies from USB ports and Blu-Ray Discs."
Setting aside the problem that the Xbox console does not support Blu-Ray discs, these
attributes are confusing. In order to view virtually any type of HD content, the Xbox needs to
support the H.264 standard. It is hard to understand how there could be an Xbox product
(hypothetical or not) which can "stream or download HD content" but does not have H.264
decoding capability.

29.   Dr. Sukumar has made the common mistake of specifying product attributes not
by the features which consumers value but by engineering specifications. The typical consumer
does not actually care about whether the Xbox has H.264 decoding capability, but, instead,
values the ability to view HD content. The use of engineering specifications shows that the
surveys were poorly crafted and did not benefit from input from either qualitative interviews
with Xbox users or pre-testing.

30.   Dr. Sukumar's entire report is based on survey sample data. The justification
for sampling is that it is not practical to interview the entire population of Xbox users, owners
or individuals likely to purchase an Xbox. Instead, a sample is taken from this large
population. The results from this sample are only relevant to the extent to which the sample is
representative of the population. Sampling statisticians have devised probability sampling
procedures that guarantee that the sample is representative of the larger population. Dr.
Sukumar does not use a probability sampling method. Instead, he uses the Authentic Response

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panel as his sampling frame. Only members of this panel can be selected for interviewing.
There is no evidence that the Authentic Response panel is representative of the US population,
much less the population of Xbox owners and users. Dr. Sukumar has presented no evidence
of procedures (if any) used by Authentic Response to insure representativeness and curb fraud.
On the other hand, there is reason to believe that the Authentic Response panel is a non-
representative sample of US residents who are willing to take surveys for compensation.
Almost certainly, the Authentic Response panel is skewed toward older and middle income US
residents. Since the Xbox console appeals to younger people, it is likely that the Authentic
Response panel is particularly biased for the Xbox population. Dr. Sukumar directed that more
than 46,000 invitations be sent by Authentic Response to obtain possible respondents. These
46,000 invitations yielded only about 7,500 respondents for screening. This is a low response
rate of 16 per cent. There is no way to tell if there was a substantial response bias. That is,
those panelists who responded to the invitation are different in their valuation and use of Xbox
features from those panelists who did not accept the invitation.

31.   We do not know if the samples used by Dr. Sukumar are representative of Xbox
users in terms of their preferences for Xbox product features. Since Dr. Sukumar uses a non-
random convenience sample instead of a probability-based sample, it is very important that he
establish that his sample is representative in their valuation of the Wi-Fi and HD viewing
features of Xbox consoles. However, there is no discussion or evidence in Dr. Sukumar's
report to that end.

32.   One of the problems with using an internet panel of respondents who are
compensated for survey completion is that some panelists could be "professional survey
takers." That is, there are respondents who don't devote sufficient time or cognitive resources
to completing the survey, hurrying through to collect the incentive. From the data produced in
the undocumented files, one can find information on the length of time respondents took to
complete the 802.11 survey (this was contained in the file MOTM_WASH1823_0603539.SAV

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in the field entitle "sys_ElapsedTime"). It is unclear whether this is the time required to complete only the conjoint survey or whether it is the length of time to complete the entire questionnaire. However, inspection of this data reveals that 75 per cent of the respondents took less than 4.17 minutes to complete the conjoint survey. The conjoint survey consisted of 15 "choice" tasks, each specified by a screen that is dense with text inputs and with esoteric engineering specifications, as discuss above. Just to read all of the screens in the conjoint exercise would require a typical respondent to devote more than 4 minutes. This data casts great doubt over the value of this survey as it appears that the bulk of the respondents did not devote any substantial effort to completing the survey.

33.   Tables 11 and 15 of Dr. Sukumar's report summarize what he calls the "Market Value for the Improvement of a Feature" (MVAI). Dr. Sukumar did not measure the market value of any of the patented features. Instead, Dr. Sukumar's conjoint analysis is designed to measure the willingness of respondents to trade off the presence of device features versus price; that is, to measure what a respondent might be willing to pay for the feature. Analysis of these choices made among hypothetical products with and without the features of interest is used to calculate what is called the Willingness To Pay. For example, if a respondent is willing to pay $30 for the "Stream or Download HD content" feature, then a respondent would select a $300 Xbox with the "Stream or Download HD content" feature over a $280 Xbox without the feature.

34.   Willingness To Pay is a concept that is defined at the individual consumer level. Willingness To Pay is the maximum price a consumer is willing to pay for a product or product feature. Consider the Xbox product as a whole. Each consumer has a maximum amount they are willing to pay for this product. For example, some consumers may be willing to pay a great deal for a Xbox. That is, even if Microsoft raised the price of an Xbox console to $5000, there may be some people who are willing to pay this amount for the product. In general, anyone who is observed to purchase a product has a Willingness To Pay of at least the price of

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the product. The Willingness To Pay concept can be extended to features of a product. For example, consider the Wi-Fi feature. The Willingness To Pay for the Wi-Fi feature is defined as the Willingness To Pay for an Xbox console with Wi-Fi, minus the Willingness To Pay for an Xbox that is identical in every way except that the Wi-Fi feature is missing. The problem, of course, is that an Xbox without Wi-Fi is not available in the market place. For this reason, a conjoint survey asks respondents to consider various hypothetical products that are similar to products found in the market place but with and without various features.

35.   Dr. Sukumar's survey and calculations are designed to produce a WTP measure for each of the features he has been asked to value. His survey is not well designed to compute WTP measures because of confusing and misleading feature descriptions. And the average length of time to complete the survey suggests strongly that the reported values are unreliable.

36.   Dr. Sukumar uses survey data to form an estimate of the WTP for various Xbox product features. He uses his sample data in a complicated set of statistical calculations to obtain his estimate of WTP.   I have already explained that Dr. Sukumar has not established that his sample is representative of the class. Without such proof, any calculation performed on the sample data cannot be projected to the larger population. Even if we set aside concerns for the representativeness of his sample, Dr. Sukumar still fails to adhere to scientific standards for the use of statistical estimates. All statistical estimates must be accompanied by a measure of the degree of statistical or estimation error present in those estimates. In a simple survey, this is usually represented by a margin of error or confidence interval for any sample quantity. For example, if we interview Washington residents regarding a proposed tax increase, we would obtain a sample estimate of the proportion of respondents who favor the tax increase. Since we are using only a sample of Washington residents, we must recognize that this estimate has sampling or statistical error in it (that is if we re-sample we will not get exactly the same proportion). There are well-recognized statistical formulae that allow for the computation of a margin of error.

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37.   It is scientifically unacceptable to publish the results of the survey without a margin of error estimate. For example, suppose we use a very small sample and find that 60 per cent of Washington residents oppose the tax increase. It is entirely possible that the margin of error for a small sample could be large and the correct reporting would be to say our best estimate is 60 per cent opposing but the margin of error is + or – 15 per cent. This means that we cannot conclude that the majority of Washington residents oppose the tax increase. If the margin of error is that large, we don't have sufficient information to make any statement about whether the proportion who oppose the tax increase is greater than or less than 50 per cent.

38.   Dr. Sukumar provides a number of statistical summaries of his 802.11 and H.264 survey data in tables 5-10, 12, and 13. He does not provide a margin of error for any of these sample-based estimates.

39.   The most important sample estimates in Dr. Sukumar's report (with respect to reasonable royalty) are his WTP computations in tables 11 and 15. Dr. Sukumar claims to have produced "lower" and "upper" confidence interval "limits" for his MVAI numbers. Given that he is using a Bayesian method to make his calculations, it is not appropriate to compute "confidence" limits as this is what is called a "sampling" theoretic concept. Bayesian methods do not produce confidence limits. This means that whatever calculations Dr. Sukumar has undertaken in his report are incorrect. Dr. Sukumar has mis-applied whatever statistical formulas he used to compute confidence limits.

40.   In his report and supporting documentation, Dr. Sukumar does not provide any documentation on how he computed the upper and lower "confidence" limits reported in tables 11 and 15. In response to my request (through Microsoft counsel), I was provided a spreadsheet with the details about his calculation and a reference to a standard textbook in statistics. From inspection of the spreadsheet, it is evident that Dr. Sukumar has misapplied an approximate formula for the standard error of the ratio of sample averages. His MVAI is not a ratio of sample averages but, rather involves a ratio of weighted sums of Bayes estimates for

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each respondent's partworths. It is possible to use Bayesian methods to compute a margin of error or a Bayesian Credibility region for Dr. Sukumar's MVAI numbers but it is not appropriate to use the formula for a ratio of sample averages, as Dr. Sukumar has done. This means that Dr. Sukumar has yet to produce a valid margin of error for any calculation undertaken in his report.

41.   It is a simple matter to see that Dr. Sukumar's "margin of error" or confidence limits are not only wrong but too small. That is, the true margin of error in his calculations is much larger than he reports. Dr. Sukumar undertook two surveys which valued the "Built-in Wi-Fi compatible with B/G/N networks" feature. This was included in both the 802.11 and H.264 questionnaire. In table 11 (Report, p. 11) he presents his MVAI computations for this feature using the H.264 sample. He estimates an MVAI of $95.32 with a confidence interval from $79.31 to $110.71. He also included and valued this feature in his 802.11 sample, the MVAI results from which are reported in table 15. For the 802.11 sample, he estimates an MVAI of $127.60 which is above the upper limit of the confidence interval from the H.264 sample. In fact, the entire confidence interval for this feature from the 802.11 sample is outside the interval constructed from the H.264 sample.

42.   Since Dr. Sukumar does not report any valid margins of error or proper Bayesian intervals for his MVAI computations, it is not possible to assess the reliability of the numbers reported in the tables. If, for example, the true margin of error for the value of the "Built-in Wi-Fi compatible with B/G/N networks" were +/- $100, then we wouldn't know if the true MVAI for this feature is reliably greater than zero.

43.   Dr. Sukumar fails to adhere to scientific standards for the presentation of statistical evidence by failing to compute any valid margin of error for his sample-based estimates of either usage or MVAI.

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1   Dated August 27, 2012.

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6   Peter E. Rossi, Ph.D.

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CERTIFICATE OF SERVICE

I, Linda Bledsoe, swear under penalty of perjury under the laws of the State of Washington to the following:

1.   I am over the age of 21 and not a party to this action.

2.   On the 27th day of August, 2012, I caused the preceding document to be served on counsel of record in the following manner:

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DATED this 27th day of August, 2012.

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s/ Linda Bledsoe
LINDA BLEDSOE

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